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claims pto

12/29/06

L.Ellis

and workforce requirements with the aid of a computer system.

defining a business structure in the computer system:

defining a fur-case structure in the computer mystem, wherein certain hier-rehical levels of the forecast structure map to corresponding hierarchical levels in the business structure:

forecasting business volume in the computer system for a predefined duration, responsive to a first set of historical data. and to the business and forecast structures:

forecasting a traffic pattern in the computer system for the predefined duration, responsive to a second set of historical data, and

calculating workforce requirements in the despeter system for the predefined duration, based on the forecast business volume and on the forecast traffic pattern,

wherein the stap of calculating workforce requirements includes resource leveling, and

wherein the step of resource leveling comprises ceremining valleys in a preliminary schedule, ranking the valleys based on their depth and width.

a lighted to a nighest-ranked valley, and

repeating the stops of determining peaks, determining valleys, ranking the valleys, and assigning at least one constigued task to the highest ranked valleys,

wherein each valley's rank is computed as (D/WI*C. Wherein

- G to the walley's depthe.
- W is the valley's wisth, and
- C is the valley's counding coat.
- Foriginal) The sethod of Claim 1, wherein a portion of the first set of historical data is by day.
- foriginal) The method of Claim 1, wherein a first portion of the first set of historical data is by period.
- 4. (original) The method of Claim 3, wherein a period is fifteer nituites.
- joriginal? The method of Claim 4, Wherein a sweeted portion of the Circl set of historical data to by day.

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- 6. Cortginal) The method of Claim 1; wherein forecasting busings volume comprises using a daily trend forecasting algorithm.
- 7. (uriginal) The sathod of Claim 1, wherein forecasting makings volume comprises using an exponential emoothing algorithm,
- 8. (griginal) The method of Claim t, wherein forecasting business votume comprises forecasting daily quantities over a predefined duration.
- (original) The network of Glaim 1, wherein forecasting business volume to performed at plural levels of the forecast attracture.
- 10. (original) the sethed of Claim 1, wherein at least one hierarchical level of the forecase structure which maps to a corresponding hierarchical level in the business etructure is location.



- 11. (previously presented) The nethod of Claim 10, further comprising subdividing in the cosputer system a location into a pignality of sub-locations.
- 12. (original) The method of Claim 1. Wherein at least one hierarchical level of the forecast structure which maps to a corresponding hierarchical level in the business structure is department.
- 13. (original) The nethert of Chain 1, wherein at least one hierarchical level of the foregant structure Which maps to 4 corresponding hierarchical level in the business structure is job.
- 14. (original) The method of Claim 1, wherein the certain hierarchical tavals in the forecast offucture are at different depths within the forecast structure than the operesponding hierarchical levels in the business structure.



13. The meshod of Claim 1, further comprising:

for exacting a traffic pattern for the predefined direction, responsive to a second set of histories? dista-

- 16. Anginals the method of Chaim 15. wherein the second set of bistorical data is independent of the first set.
- 17. (original) The method of Claim 15. wherein the first and second sets of historical data overlap.

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18. (origin) The nethed of Claim 15 wherein the forecast traffic pattern is a composite of historical data from a plurality of selected dates.

19. (corrently anended) The dethod of Uleim 18. wherein the selected dates are selected by:

finding in the computer system a predeternined number of dates which best natch designated criteria.

20. (currently brended) The wathod of Claim 10, wherein designated uniteria include some day of week, nobicest day, event ratio and same open/close time, further comprising:

sasigning in the computar system a weight to each criterion.

21. The method of Claim 15 forther comprising:

ententring wantstoice requirements for the predefined dutation, based on the foregraphic business volume and on the foregont traffic pattern

- 22. iproviously presented) The method of Claim 1, wherein cultulating workforce requirements includes tank level consolidation.
- 23. (original) The method of Claim 22. Whorein Lauk level consolidation comprises:

acheduling specific tanks within a job, wherein each tank is associated with a standard; and

compolidating the scheduled tasks into a job schedule.

- 20. (original) The method of claim 23. wherein a decision to apply a standard is based on economy of ecals.
 - The method of Claims 21, wherein extenditing workforce requirements includes resource leveling.
 - 16 The method of Claim 25, observing resource leveling corresposas:
 - the Setermizing volleys in a prehimetery settedule;

tanking the valleys;

usugaing at least one unassigned task to a highest-ranked valley, and repeating the steps of determining peaks, determining valleys, ranking the valleys and assigning at least one unusugant 388%.

25. (previously presented) The method of Claim 1. further comprising:

determining in the computer system peaks in the preliminary schedule. Wherein determining valleys is responsive to the determined peaks.

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- 15 27 The method of Claim 26, wherein valleys are ranked based on their depth and wides.
 - The method of Claim 27, wherein each valley's content is compared as (D/W) * C, wherein

D is the valley's depth;

Wis the valley's watth; and

C is the valley's rounding cost.

- 30. In Plously presented) The sethed of Chain t, wherein the at least one unassigned task is assigned to a lowest portion of the highest-ranked valley.
- 31. (previously presented) The method of Chain 1, wherein calculating workforce requirements includes dynamic standard assignment, wherein different netring Axe selected at different times.
- 12 [original] The method of Claim 11, whorein at least one task is associated with a plurality of stendards.
- 39 (original) The rethod of Their 31 wherein selection of netrics at a specific time is responsive to conditions at the specific time.
- 34. (original) The method of Claim 33, wherein at least one condition is outdoor temperature.
- 36. (previously presented) the nethod of Claim 1, further comprising:

defining an event calendar in the compater system; and

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selecting at least one event from the event galumdar and that the event is considered in the step of foretasting.

- so, rariginal) The method of Claim 35, wherein, if a selecte event does not occur during the forecast period, its influence i removed from the forecast if the event occurred during corresponding period from which the historical data was taken.
- 37. (original) The method of Claim 35. Wherein if a delecte event occurs during the forecast period, its influence is added the forecast if the event did not occur during a corresponding period from which the historical data was taken.
- 38. (previously presented) The method of Claim 35. furthe comprisings

defining an event in the computer system to be associate with at least one category in the icrocost structure.

- 1). (original) The method of Claim 35, wherein a plurality of events can be selected for a particular day.
 - 40. (previously presented) The method of Claim 35, further comprising:

when calculating forecast values for an upoposing day marked with an event, describing in the computer system for dates marked with the cone event marker:

upon finding such a date, calculating in the computer system a ratio of volume activity associated with said date to the volume activity of plural days currounding said date;

calculating in the computer system a forecast for the uputaling day so if it were a nursal, non-event day, and

adjuncting in the computer system the forecast by the calculated ratio.

- 41. (original) The method of Claim 40. wherein the steps Of calculating a forecast, and adjunting the torecast sen executed for each business volume.
- 42. foriginal) The method of Cluim 1. Wherein business volume types are user-definable.

- .43. (original) The nethod of Claim 42, wherein business volume types comprise only or all of sales volume, number of transactions.

 and number of from.
- es, (previously presented) The marked Ol Claim 1, Farther comprising:

tracking in the computer events only a subset of volume types at a particular location.

- 48. (original) The mothed of Claim 1, wherein the forecast structure comprises plured hierarchical levels of categories.
- 3 46. A hust area volume and workforce requirements fix occusion; system, texopositize:
 - a fineers structure, wherein certain hierarchical levels of the formast structure map to corresponding hierarchical levels in the besiness structure:
 - a volume forecaster which forecasts business volume responsive to
- 10 historical data and to the business and textensis anterest and
 a workfore requirements angine which forecasts workforce
 requirements residentive to the forecast business volume
 - The system of Chain 46 wherein the volume forecaster forecasts business volumes at plural levels of the forecast standare.
- 15. The system of Claim 46, wherein in least one-digneralized level of the farrents structure which maps to a corresponding hierarchical level in the business quantum est any of lucation, job and department.
 - The system of Claim 48, wherein a location is divided into a plurality of sublocations.
- 20 50. The system of Claim 46, wherein the centain betweenical levels in the furnishing time or an influence depths within the forecast structure than the perception for the business structure.

ar Omic.

51. The system of Chim 46, wherein the volume forecaster comprises:

a volume forecast engine which forecasts business volume for a prodefized distance, responsive to a first six of historical data and to the business and forecast structures, wherein the work force requirements engine is responsive to the valence forecast engine.

- The system of Claim 51, wherein the volume forecost engine uses a dady trend forecasting algorithm.
- The system of Claim S1, wherein volume forcess) engine uses an exponential smoothing algorithm
- 10 54. The system of Claim 51, after an the volume forceaster comprises:

 a traffic pattern engine which forceasts besiness volume based on traffic
 patterns over a second for of histogreal data, wherein the workforce requirements
 therein is responsive to the traffic pattern engine.
- 55. The system of Claim 54, segment the second set of businesical data is independent of the first set.
 - The system of Claim 54, wherein the first and second sets of historical data overlap.
 - 57. The system of Claim 54 wherein the forcessi traffic poteen is a composite of bistorical data from a plurality of selected dates.
- 20 58. The system of Claim 52, wherein a prodetermined member of dates are selected which best match designated exists;



- 9 This system of Claim 58, wherein designmed extends include some day of work, nearest day, even tano and some open/close time.
- 60 The system of Claim 39, wherein the enteria are weighted.
- 63 The system of Chain 46, wherein workforce requirements engine performs task level consolidation.
- 62. The system of Claim 61, wherein the workforce requirements outline schodules a specific task within a job according to at least one standard with which the task is associated, and wherein the workforce requirement engine consolidates the artheduled tasks into a job schedule.
- 30 fd The system of Claim 62, wherein a decision to apply a standard is bosed on economy of scale
 - 14 The system of Chira 40, wherein the west functionquienteens engine performs resource to chira.
- 15. The system of Chiro 64, wherein the weeklerge regalerments cagine determines
 valleys in a preliminary schedule, ranks the volleys, and assigns in team one armsigned task to a lughest-region valley.
 - The system of Claim 65, who min valleys are ranked based on their depth and width.
- The system of Claim 55, wherein eath valley's ranked is computed as
 (D/W) * C, wherein

D is the valley's depth;
W is the valley's width, and
C is the valley's rounding cost.



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- 68 The system of Claim 65, wherein the workforce requirements engine determines peaks to the preliminary schedule, said peaks determining the valleys.
- 69 The system of Chain 55, wherein the m least one unassigned task is assigned to a lowest portion of the highest-carkent valley.
- The system of Claim 46, wherein calculating workforce requirements includes
 dynamic standard assignment, wherein different metries are selected at different
 times.
- 71. The system of Claim 46, further comprising:
 - are event ratio engine, responsive to an event calcidar, which selects at least one event from the event calcidar, the event to be considered by the volume forecaster.
- 15 72. The system of Claim 73, wherein, if a extected event does not order during the forecast princip, its influence is removed from the forecast if the event occurred during a corresponding period from which the historical data was taken.
 - 73. The system of Claim 31, wherein if a referred event occurs during the forecast period, its influence is added to the Corecast if the event did not occur during a corresponding period from which the historical data was taken.

- 74. The special of Claim 71, an event is associated with at feast one extensionly so the forecast structure.
- The system of Chain 71, wherean a plurality of events are associated with 4
 particular day.
- 5 76. The system of Claim 71, wherem, upon finding a historical date marked with an every marker which agrees points to a forecast date for which a forecast is being performed, the event rank engine rabulates a natio of values activity associated with said historical date to the volume activity of phasel days surrounding axid historical date, nativalates a forecast for the forecast date as if it were a normal, non-event day, and adjunts the forecast by the calculated ratio.
 - The system of Chain To, wherein the event ratio engine calculates a ratio and adjusts a forecast for each harmon volume.
 - 78. The system of Claim 46, wherein business sufures types we use idefinable.
- 79. The system of Claim 38, wherein business vulume types compaise any or all of tales volume, random of transactions, and exames of them.
 - The system of Claim 1, wherein only a subset of volume types at a particular lucation are tracked.
 - 51. The system of Claim 46, wherein the forecast structure comprises plant hierarchical levels of established.
- 20 82. A business volume and workforce sequitements forecasting system, comprising

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means for defining a business structure:

means for defining a forecast structure, wherein orders binauclical levels of the forecast structure is up to corresponding hierarchical levels in the business structure,

means for functioning hyspicits volume, responsive to the husbass and

means for foreresting workforce requirements, responsive to the forecasting business victima recurs.

83. The system of Claim \$2, wherein means for forecasting business solumns computes of least one off.

means for forerazzing business volume for a prodefitied duration, responsive to a first set of lifetarizal data; and

means for forecasting a traffic pattern for the predefined damping, responsive to a second set of historical data.

15 S4. The system of Claim 82, further comprisings

means the selecting it trust one event from in event estiman such that the event is considered by said forecasting business volumes reconst.

83. The system of Claim 82, further comprising:

resource by ching means, responsive to said forcessing workforce requirements means and to resource leveling ranks.

36 A competer program product for forecasting business suitane used work forecast, the computer program product computing a computer usable maxima having computer rescable code thereon, including program code which:
provides ratios for defining a business structure.

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provides rarans for defining a forecast structure, wherein certain bigrarchical levels of the forecast structure map to corresponding hierarchical levels in the business structure;

sorecasts business volume, responsive to the business and Counts, structured and

forecasts workforce requirements, responsive to the forecasting business volume means.

87. A comparer data signal embedded in a current wave for forecesting beatiness volume and work butte requirements, comprising:

programs code for defining a basisters structure;

programs code for defining a forecast structure, wherein certain texture birds forces of the formess structure map to corresponding hierarchical levels in the business structure;

program each für Processing business volume, responsive to the business and threecest sometimes; and

program code for foremitting weekfurer requirements, responsive to the forecasting business volume means.

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